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**Executive Summary**  
**Telecommunications Obstruction Analysis**  
**Kittitas Valley, Washington**

Comsearch was contracted by Zilkha Renewable Energy (Applicant) to identify and analyze potential effects of the proposed wind power Project on existing microwave telecom systems in Kittitas County, Washington. To do this, Comsearch utilized its Wind Power GeoPlanner™ product.

Comsearch has been in the telecommunication consulting business for over 25 years. In that time Comsearch has designed quality solutions to interference and compatibility issues affecting the ever-changing communication field. The quality solutions are made possible by a dedicated technical staff of telecommunication specialists supported by skilled software and support staff. The software tools and databases that are used by Comsearch are the most sophisticated and accurate in the business. The Wind Power GeoPlanner™ was developed by Comsearch's engineers, software and geographic information system (GIS) staff to deal with the type of issues present in Kittitas County. Comsearch personnel who worked on this analysis included Roger Maier (Product Manager), Will Perkins (Engineer) and Les Polisky (Engineer).

Wind Power GeoPlanner™ was created by spatially enabling the turbine locations provided by the Applicant. Comsearch then loaded its microwave path data (including Common Carrier (CC), Operational Fixed (OF) and TV services) from its database, which is derived from the Federal Communication Commission (FCC) license files but has some enhancements and contains improved information gained from various sources not available to the FCC. A turbine blade radius of 40 meters (80 meters diameter) was utilized based on the fact that this is largest blade radius proposed for use at this site by the Applicant. The turbine locations were then buffered by this radius to create a blade file.

In addition to the blade file, a worst case Fresnel Zone (WCFZ) was calculated for each microwave path in the Project area. The mid-path Fresnel Zone was calculated for each path using the following formula.

$$Rn \cong 17.3 \sqrt{\frac{n}{F\text{GHz}} \left( \frac{d_1 d_2}{d_1 + d_2} \right)}$$

Each path in the project area was then buffered by its specific radius.

To evaluate potential obstruction, an analysis was run to see which of the WCFZ intersected the 40-meter radius blade file (Figure 1A). Based on the proposed turbine locations and the WCFZ calculations, Comsearch was able to determine that a total of twelve (12) of the planned turbines were potentially obstructing five (5) microwave paths (Figure 1B).

Turbine Name	Obstructed Path(s) Number
A-1	5,7,8,22
A-2	5
A-3	5
A-4	5
A-5	5
A-6	5
A-7	5
A-8	5
K-3	3
M-23	3
M-24	3
M-25	3

Figure 1B - Obstruction Findings

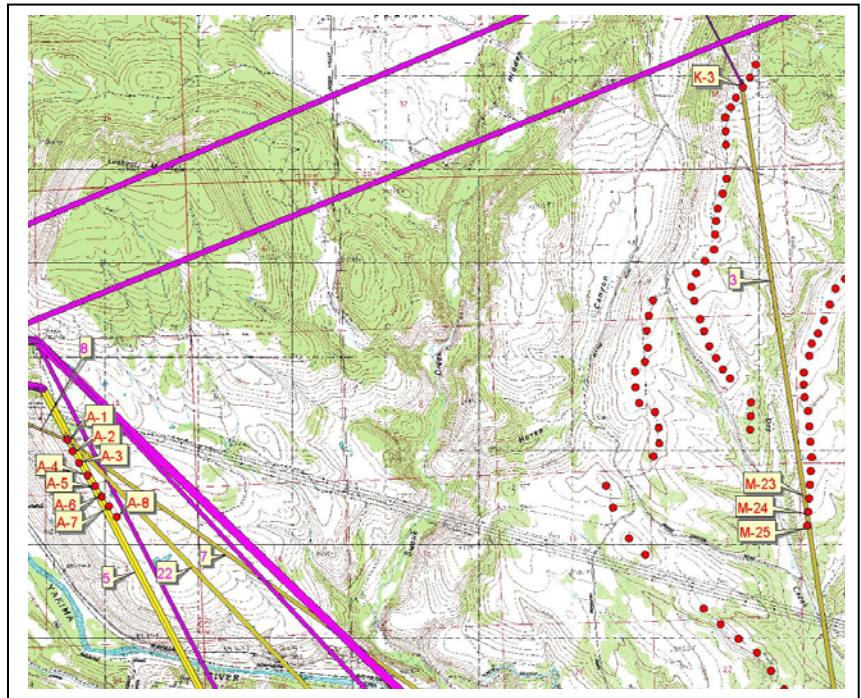
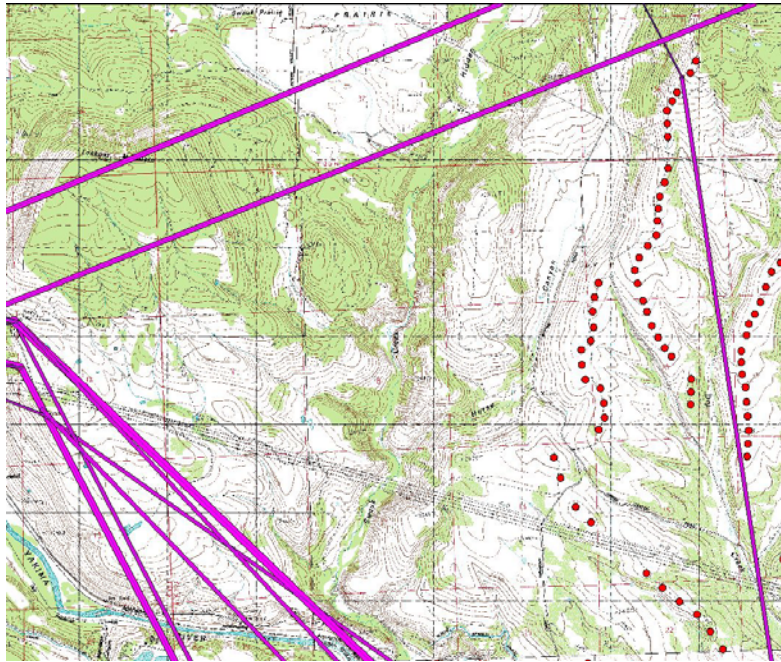


Figure 1A - Proposed Turbine Locations and Existing Microwave Path Data (Zoom)

Based on these findings, several options were discussed with Zilkha, which would prevent obstruction of these paths or provide additional information. They included,

1. Re-analyzing the five microwave paths based on a "true" Fresnel Zone calculation
2. Relocating the twelve turbines such that each is out of the individual paths Worse Case Fresnel Zone
3. Abandon construction of the twelve turbines.

Option 3 was eventually chosen. With the removal of the twelve locations, the microwave data was again uploaded and verified against the turbine locations to ensure clearance (Figure2).



*Figure 2 - New Proposed Turbine Locations and Existing Microwave Path Data*

**Conclusion:**

With the 12 wind turbines removed from the construction plan there will be no obstruction to licensed microwave operations after the Project is installed.